

# Chronic Kidney Disease Care in the US Safety Net

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The US Health Care System provides a patchwork of services, known as the safety net, for the uninsured, underinsured, and indigent populations who would otherwise have little access to health care services. Individuals who rely on safety-net facilities are from racial/ethnic minority groups, have low socioeconomic status, and often have low health literacy and/or limited English proficiency. They shoulder a disproportionate burden of CKD in the United States and experience excess CKD-associated morbidity and mortality. Suboptimal delivery of CKD care may be contributing and is an area of active translational research. Several initiatives that show promise in improving safety-net CKD care delivery include those that enhance diagnostic and management skills of primary care providers, rely on comprehensive care management programs led by nonphysicians, and leverage technology to enhance patient access to virtual nephrology expertise. Uncovering better ways to translate scientific evidence into practice for vulnerable patients with CKD is a formidable challenge that will require national surveillance of CKD quality measures across diverse ambulatory health systems, including safety nets. Only then will the nephrology community be to identify and share best practices to enhance health and mitigate disparities of care among patients with CKD.

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## What Is the US Safety Net?

The US Health Care System provides a patchwork of services for the uninsured, underinsured, and indigent populations who would otherwise have little access to health care services. This patchwork, known as the health care safety net, includes federally and community-funded community health centers, county health departments, local access-to-care programs such as homeless health centers and church-based health clinics, and services provided by public hospitals to vulnerable populations.<sup>1</sup> Safety-net facilities provide medical services to all individuals regardless of their insurance or migrant status at no cost or on a sliding scale based on income. As such, they generally operate as nonprofit organizations and rely heavily on public and private funding to subsidize care for the poor. The federal government has traditionally been a strong partner in this regard. In 1991, the Federally Qualified Health Center benefit was added to the Medicare program to enhance the provision of ambulatory care to underserved urban and rural communities. Subsequently, between 1994 and 2001, the federal Consolidated Health Center Program, which pays for primary

care and preventive services for underserved populations, grew from covering 7.3 million to 10.3 million individuals. In 2001, capacity to care for the underserved was further expanded by the Health Center Growth Initiative. By 2007, approximately 16.1 million individuals received care from the safety net. Now, with implementation of the Affordable Care Act and current/expected Medicaid expansion in 25 states and the District of Columbia, the United States is poised to further expand its ability to care for vulnerable populations that depend on safety-net institutions for health care.

## Sociodemographic Characteristics of Safety Net Patients With CKD

Individuals who rely on safety-net facilities for medical care often have limited socioeconomic means, are from racial/ethnic minority groups, and have low health literacy, and/or limited English proficiency.<sup>2,3</sup> As has been extensively documented throughout this issue, these groups shoulder a disproportionate burden of CKD in the United States and comorbid conditions that serve as risk factors for CKD development and CKD decline, such as diabetes, obesity, and hypertension.<sup>4,5</sup> Although there is a paucity of aggregated data from community health centers that provide safety-net care, data from single institutions reinforce the idea that safety-net clinics play a central role in caring for individuals with CKD. This is particularly true for, nonwhite individuals, who are at high risk of experiencing progression of CKD to ESRD.<sup>6,7</sup> Recent data from the San Francisco Health Network, the integrated public health care delivery system for San Francisco's uninsured and underinsured population, for example, describe a CKD population in whom one-half is younger than 60 years and one-fourth is younger than 50 years. This is in contrast to estimates from a nationally representative sample of US adults that find CKD to be relatively uncommon among individuals younger than 60 years.<sup>8</sup> Among the San Francisco population with CKD, approximately 70% were members of nonwhite racial/ethnic groups, more than 40% were uninsured or enrolled in Medicaid, and 72% were

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indigent, defined by an annual income <15,000.<sup>9</sup> Data from the National Kidney Foundation Kidney Early Evaluation Program, a free community-based health screening program that targets populations at high risk for kidney disease, and the National Health and Nutrition Examination Survey (NHANES) suggest similar sociodemographic characteristics among nationally representative uninsured individuals with CKD,<sup>10,11</sup> the majority of whom report seeing a physician within the prior year, presumably from a safety-net provider.

### Health Outcomes Among Safety Net Patients With CKD

Data from the 86,000 individuals who presented for a Kidney Early Evaluation Program health screening between 2000 and 2011 demonstrate an increased risk of death among uninsured and publically insured individuals with and without CKD compared with those with private insurance. The uninsured population had much higher odds of death (adjusted odds ratio [AOR] = 1.66, 95% CI 1.43-1.94) and the publically insured population had more than a 2-fold higher odds of death (AOR = 2.37, 2.01-2.78) compared with those with private insurance. An increased risk of progression to ESRD among the uninsured and publically insured individuals with CKD and an estimated glomerular filtration rate greater than 30 mL/min/1.73 m<sup>2</sup> compared with those with private insurance was also noted (AOR = 2.09, 1.31-3.35 and AOR = 3.10, 1.92-5.00, respectively).<sup>10</sup> Similarly, reported incidence rates of ESRD among Hispanic and non-Hispanic whites were higher in the San Francisco safety net compared with estimates from a similar geographical population insured by Kaiser Permanente Northern California around the same time period.<sup>6,9</sup>

### Contributions to Adverse Health Outcomes Among Safety Net Populations With CKD

Although it is difficult to disentangle the patient-level, provider-level, and system-level contributions to adverse health outcomes among socially disadvantaged populations, it is clear that elements exist in each of these domains. At the patient level, nontraditional risk factors for CKD progression and mortality have been identified that may compound the increased risk already present from the high prevalence of diabetes, obesity, and hypertension in these patient populations. At the provider level, suboptimal knowledge, competing priorities, and risk factor management likely play a key role. And at the system level, delivery of fragmented nephrology care from a paucity of specialists is likely contributing (Fig 1).

### Patient-Level Factors

It is widely appreciated that traditional risk factors for CKD progression such as hypertension, diabetes, and obesity are more prevalent among populations who receive care from safety-net settings.<sup>12</sup> Exacerbating the issue, however, are highly prevalent, noncardiovascular conditions like homelessness, depression, and periodontal disease that may biologically contribute to CKD progression and mortality as well as nontraditional behavioral and social factors.

### Nontraditional Biologic Risk Factors

In 1 study of low-income urban adults with CKD, homeless individuals experienced 28% higher risk of ESRD or death over a median follow-up of 2.6 years compared with housed counterparts, independent of sociodemographic variables, comorbid conditions, and laboratory variables (adjusted hazard ratio [aHR] = 1.28, 1.04-1.58).<sup>13</sup> Of interest, this association differed by substance abuse status. Among adults without a history of substance abuse, risk of ESRD or death was higher among the homeless compared with housed adults (aHR = 1.54, 1.18-2.03). Among adults with a history of substance abuse, there was no difference in ESRD or mortality by housing status, suggesting an independent relationship between substance abuse and ESRD/mortality. The nature of this relationship is not entirely clear, however. Several studies have demonstrated an increased risk of CKD progression and incident ESRD among individuals who self-report

illicit drug use.<sup>14</sup> But, one recent study only found a small association between cocaine use and CKD progression and did not find any association between methamphetamine or heroin use with CKD progression or development of ESRD.<sup>15</sup> Less controversial is the contribution of depression to adverse health outcomes among individuals with CKD. Among veterans with CKD, presence of a major depressive episode has been independently associated with increased hospitalizations (aHR = 1.90, 1.23-2.90) and progression to ESRD (aHR = 3.51, 1.77-6.97), though not increased mortality (1.52, 0.53-4.34).<sup>16</sup> Similar data have emerged from participants of the African American Study of Kidney Disease cohort.<sup>17</sup> The plausible biologic mechanisms underlying the associations between homelessness, addiction, and depression and adverse health outcomes may involve inflammation, compromised immunity, and platelet activation from altered serotonin levels.<sup>18-21</sup> Similar mechanisms seem to link periodontal disease, highly prevalent in safety-net populations presumably because of the lack of access to dental care,<sup>22</sup> with

#### CLINICAL SUMMARY

- Individuals who rely on safety-net facilities for medical care shoulder a disproportionate burden of CKD and experience excess associated morbidity and mortality.
- Several initiatives show promise in improving safety-net CKD care delivery: enhancing diagnostic and management skills of primary care providers, providing comprehensive care management programs led by nonphysicians, and leveraging technology to enhance patient access to virtual nephrology expertise.
- Uncovering better ways to translate scientific evidence into practice for vulnerable patients with CKD will require a national database of CKD quality measures across diverse ambulatory health systems, including safety nets.

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